CLAIMS

What is claimed is:

1. An apparatus for dual pass adaptive tessellation comprising:

a vertex grouper tessellator operably coupled to receive primitive information and an index list, wherein the index list is received from a memory device;

a shader processing unit coupled to the vertex grouper tessellator, wherein during a first pass, the shader processing unit receives primitive indices and an auto-index value for each of the plurality of primitive indices;

a plurality of vertex shader input staging registers operably coupled to the shader processing unit, each of the plurality of vertex shaders input staging registers coupled to one of a plurality of vertex shaders such that in response to a shader sequence output, the vertex shaders generate tessellation factors; and

the tessellation factors are provided to the vertex grouper tessellator such that the vertex grouper tessellator generates a per process vector output, a per primitive output and a per packet output.

2. The apparatus of claim 1 further comprising:

the tessellation factors provided from the plurality of vertex shaders to a memory such that the memory device may provide the tessellation factors to the vertex grouper tessellator.

3. The apparatus of claim 1 further comprising:

a plurality of coordinates generated by the tessellator in vertex grouper tessellator in response to the tessellation factor.

4. The apparatus of claim 3 wherein the plurality of coordinates are at least one of: barycentric coordinates and tensor coordinates.

5. The apparatus of claim 3 further comprising:

a plurality of tessellated vertices generated by the plurality of vertex shaders in response to a plurality of control points and the plurality of coordinates.

6. The apparatus of clam 1 further comprising a plurality of control points for higher order surfaces generated by the plurality of vertex shaders based on a plurality of corner vertices of a plurality of primitives.

7. An apparatus for dual pass adaptive tessellation comprising:

a vertex grouper-tesselator operably coupled to receive primitive information and a vertex index list from a memory device;

a shader processing unit coupled to the vertex grouper tesselator, wherein during a first pass, the shader processing unit receives primitive indices and an auto-index value for each of the plurality of primitive indices;

a math processing unit coupled to the vertex grouper-tessellator, the math processing unit including a plurality of input staging registers and a plurality of arithmetic logic units;

a control flow processor operatively coupled to the math processing unit wherein the control flow processor drives the math processing unit; the memory device operably coupled to the plurality of vertex shaders such that the tessellation factors are stored therein; and

the vertex grouper tessellator retrieves the tessellation factors in second pass such that the vertex grouper tesselator generates a per process vector output, a per primitive output and a per packet output.

8. The apparatus of claim 7 further comprising:

a plurality of coordinates generated by the vertex grouper tesselator in the second pass in response to the tessellation factor.

9. The apparatus of claim 8 wherein the plurality of coordinates are at least one of: barycentric coordinates and tensor coordinates.

10. The apparatus of claim 8 further comprising:

a plurality of tessellated vertices generated by the plurality of vertex shaders in response to a plurality of control points and the plurality of coordinates.

11. The apparatus of clam 7 further comprising a plurality of control points for higher order surfaces generated by the plurality of vertex shaders based on a plurality of corner vertices of a plurality of primitives.

12. A method for dual pass adaptive tessellation comprising:

in a first pass:

receiving primitive information and an index list, wherein the index list is received from a memory device;

generating primitive indices from the primitive information and an auto-index value for each of the primitive indices;

generating a plurality of shader sequence outputs;

providing the shader sequence outputs to a plurality of vertex shader input staging registers:

generating a plurality of tessellation factors in response to the shader sequence outputs; and

in a second pass:

receiving the tessellation factors as a plurality of indices.

13. The method of claim 12 further comprising:

during the second pass:

generating an auto-index value for each of the plurality of indices;

generating a plurality of bary-centric coordinates based on the tessellation factors; and

computing a plurality of tessellated vertices by fetching a control point specified by the auto-index value for each of the plurality of indices.

14. The method of claim 13 wherein the coordinates are at least one of bary-centric coordinates and tensor coordinates.

15. The method 12 further comprising:

providing the shader sequence outputs to a plurality of vertex shaders which are operably coupled to the vertex shader input staging registers.

16. The method of claim 12 further comprising:

prior to the second pass, writing the plurality of tessellation factors to a memory device; and

during the second pass, receiving the tessellation factors from the memory device.

17. The method of claim 16 wherein the tessellation factors are received from the memory device using a direct memory access.

18. A method for dual pass adaptive tessellation comprising:

in a first pass:

receiving vertex information and an index list, wherein the index list is received from a memory device;

generating primitive indices from the primitive information and an auto-index value for each set of the primitive indices;

generating a plurality of shader sequence outputs;

providing the shader sequence outputs to a plurality of vertex shader input staging registers:

generating a plurality of tessellation factors in response to the shader sequence outputs; and

in a second pass:

receiving the tessellation factors as a plurality of indices;

generating an auto-index value for each of the plurality of indices;

generating a plurality of bary-centric coordinates based on the tessellation factors;; and

computing a plurality of tessellated vertices by fetching a control point specified by the auto-index value for each of the plurality of indices.

19. The method 18 further comprising:

providing the shader sequence outputs to a plurality of vertex shaders which are operably coupled to the vertex shader input staging registers.

20. The method of claim 18 further comprising:

prior to the second pass, writing the plurality of tessellation factors to a memory device; and

during the second pass, receiving the tessellation factors from the memory device.

21. A method for dual pass adaptive tessellation comprising:

in a first pass:

receiving vertex information and an index list, wherein the index list is received from a memory device;

generating primitive indices from the primitive information and an auto-index value for each set of the primitive indices;

generating a plurality of shader sequence outputs;

providing the shader sequence outputs to a plurality of vertex shader input staging registers:

generating a plurality of tessellation factors in response to the shader sequence outputs; and

in a second pass:

receiving the tessellation factors as a plurality of indices;

receiving a primitive type indicator; and

generating a set of coordinates based on the plurality of indices and the primitive type indicator.

22. The method of claim 21 further comprising:

during the second pass:

generating an auto-index value for each of the plurality of indices;

generating a plurality of bary-centric coordinates based on the tessellation factors;; and

computing a plurality of tessellated vertices by fetching a control point specified by the auto-index value for each of the plurality of indices.

23. The method of claim 21 further comprising:

receiving a vertex reuse number; and

generating a plurality of vertices based on the vertex reuse number.

24. The method of claim 21 wherein the set of coordinates are parametric coordinates when the vertices define a plurality of tensor product surfaces and the set of coordinates are bary-centric coordinates when the vertices define a plurality of triangular surfaces.

25. The method 21 further comprising:

generating a plurality of sub-primitive vertices information.